US EPA ARCHIVE DOCUMENT

122804
SHAUGHNESSY NO.

REVIEW NO.

EEB REVIEW

DATE: IN 10/21/85 OUT FEB 14 1986

FILE OR REG. NO. 618-OL

PETITION OR EXP. PERMIT NO.

DATE OF SUBMISSION 10/03/85

DATE RECEIVED BY HED 10/11/85

RD REQUESTED COMPLETION DATE 01/29/86

EEB ESTIMATED COMPLETION DATE 01/22/86

RD ACTION CODE/TYPE OF REVIEW 126

TYPE PRODUCT(S): I, D, H, F, N, R, S Fire Ant Insecticide

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. G. LaRocca (15)

PRODUCT NAME(S) Affirm Technical

COMPANY NAME Merck, Sharp, and Dohme Research Laboratories

SUBMISSION PURPOSE Submission of further data to support registration.

SHAUGHNESSY NO.	CHEMICAL & FORMULATION	% A.I.

ECOLOGICAL EFFECTS BRANCH
REVIEW

Affirm Technical

100 Submission Purpose

The registrant, Merck, Sharp, and Dohme Research Laboratories, has submitted two estuarine studies which were requested in a June 29, 1984 review by D. Rieder.

101 Data Assessment

Two studies were received and validated.

1. 96-Hour LC_{50} with Mysid shrimp (Mysidopsis bahia)
   Results: LC_{50} = 0.21 ppb.
   Category: Core

2. 96-Hour LC_{50} with ~~Fathead~~ Sheepshead minnow (Cyprinodon variegatus)
   Results: LC_{50} = 15 ppb.
   Category: Core

102 Conclusions

The studies submitted fulfill the Guideline requirements for an estuarine fish and shrimp LC_{50}. The acute mollusc study requirement has been fulfilled. These studies were submitted to fulfill the requirements for a fire ant and bait use previously reviewed October 29, 1985. All data requirements have been fulfilled for this use.
However, other uses may require additional testing.

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Daniel Rieder 2/11/86
Daniel Rieder
Wildlife Biologist, Section 2
Ecological Effects Branch
Hazard Evaluation Division

Norman Cook 2.13.86
Norm Cook
Section Head, Section 2
Ecological Effects Branch
Hazard Evaluation Division

Michael Slimak 2/13/86
Michael Slimak, Chief
Ecological Effects Branch
Hazard Evaluation Division

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Data Evaluation Record

1. Chemical: Affirm Technical

   Sha.No: 122804

2. Test Material: MK-936 91% a.i.

3. Study Type: Fish 96-hr LC_{50}

   Species Tested: Sheepshead Minnow

4. Study I.D.: Author: Ward, G. Scott

   Title: Acute Toxicity of MK-936 to the Sheepshead Minnow (Cyprinodon variegatus)

   Laboratory: Environmental Science and Engineering, Inc.

   Study No: 85-347-0100-2130

   Study Date: October 1985

   Study submitted to EPA by: Merck Sharp and Dohme Research Laboratories

   Acc. No: 259623

5. Reviewed By:

   Daniel D. Rieder
   Wildlife Biologist
   EEB/HED

   Signature: Daniel Rieder

   Date: 1/31/86

6. Approved By:

   Norm J. Cook
   Supervisory Biologist
   EEB/HED

   Signature: Norman J. Cook

   Date: 2.13.86

7. Conclusions: This study is scientifically sound.
   96-hour LC_{50} = 15 ppb
   95% Confidence Limits = 11-20 ppb.
   This study will fulfill the guideline requirement for an estuarine fish acute 96-hour LC_{50}

8. Recommendations: N/A

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9. Background: This study was provided to support registration.

10. Individual Studies: N/A

11. Methods and Materials:

A. Test Material: MK-936
Percent active ingredient: 91%

B. Test Organisms: Sheepshead Minnow (Cyprinodon variegatus)

Source: S/P Inc.
Length: $\bar{X}$ = 12 ± 1 mm S.L.
Acclimation: 17 days, 0 hrs without food
Organisms per container: 10
No.level: 10
Weight: $\bar{X}$ = 41 ± 13 mg wet wt.
Loading: 0.046 g/l

C. Test Containers: Glass

Size: 10 liter with 9 liter test solution
Replicates: 1
Aerated: No

D. Test Conditions: Static, renewal after 48 hrs.

Photoperiod: 14 hrs/day
Temperature: 19-21 °C
Controls: Solvent and untreated
Solvent: acetone
Test solution: Natural Seawater

E. Statistics: Stephan, 1982, Moving average

12. Reported Results:

96-hour LC_{50} = 15 ppm 95% C.L. = 11-20 ppb

CONCENTRATION PPB Nominal	MORTALITY 24Hrs	48Hrs	72Hrs	96Hrs
Control	0	0	0	0
Solvent Control	0	0	0	0
4.7	0	0	0	0
7.8	0	0	0	0
13	40	50	60	60
22	70	90	90	90
36	80	90	90	90
60	100	100	100	100

13. Study Authors Conclusions:

LC_{50} (ppb)	24Hrs	48Hrs	72Hrs	96Hrs
	18	16	15	15

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14. Reviewers Discussion and Interpretation of the Study:

A. Test Procedures: The test procedure was acceptable.

B. Statistical Analysis: The statistical analysis results are consistent with the raw mortality data.

C. Discussion/Results: This test shows that MK-936 is very highly toxicity to estuarine fish.

D. Adequacy of the Study: This study fulfills the guideline requirement for an estuarine fish LC_{50}

15. Completion of One Liner for Study: One-liner completed

16. CBI Appendix: N/A

Data Evaluation Record

1. Chemical: Affirm

   Sha.No: 122804

2. Test Material: MK-936 technical, 91% a.i.

3. Study Type: Shrimp 96-hr LC_{50}

   Species Tested: Mysid Shrimp (Mysidopsis bahia)

4. Study I.D.:

   Author: Forbis, Alan D., and David Burgess

   Title: Acute Toxicity of MK-936 Technical to Mysid Shrimp (Mysidopsis bahia)

   Laboratory: Analytical Bio—chemistry Laboratories, Inc.

   Study No: 33624

   Study Date: September, 1985

   Study submitted to EPA by: Merck Sharp and Dohme Research Laboratories

   Acc. No: 259623

5. Reviewed By:

   Daniel D. Rieder
   Wildlife Biologist
   EEB/HED

   Signature: Daniel Rieder

   Date: 1/21/86

6. Approved By:

   Norm J. Cook
   Supervisory Biologist
   EEB/HED

   Signature: Norman J. Cook

   Date: 2-13-86

7. Conclusions: This study is scientifically sound.
   96-hour LC_{50} = 0.21 ppb
   95% Confidence Limits = 0.10-0.32 ppb.
   This study will fulfill the guideline requirement for a shrimp acute 96-hour LC_{50}

8. Recommendations: N/A

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9. Background: This study was provided to support registration.

10. Individual Studies: N/A

11. Methods and Materials:

A. Test Material: MK-936 Technical Affirm
Percent active ingredient: 91%

B. Test Organisms: Mysid Shrimp (Mysidopsis bahia)

Source: Env. Sci. and Eng., Inc., Gainesville, FL.
No.level: 10 Organisms per container: 10

C. Test Containers: Glass

Size: 400 ml

D. Test Conditions: Static, 96-hrs shrimp were fed c.a. 2 ml brine shrimp per day during test.

Temperature: 22 °C
Solvent: acetone
Way test was begun: shrimp added within 30 minutes after test material

Controls: Untreated and solvent
Test solution: Prepared by adding synthetic seawater salts to aged well water

E. Statistics: Stephans program

12. Reported Results:

96-hour LC_{50} = 0.21 ppm 95% C.L. = 0.1-0.32 ppb

CONCENTRATION PPB Nominal	MORTALITY				CONDITIONS		SALINITY
	24Hrs	48Hrs	72Hrs	96Hrs	DO	pH	°/oo
Control	0	0	0	0	5.6	7.6	23
Solvent Control	0	0	0	0	5.6	7.7	23
0.10	0	0	0	0	5.7	7.8	23
0.18	0	0	0	3	5.6	7.8	22
0.32	0	1	3	10	5.7	7.9	24
0.57	2	3	10	10	5.9	8.0	23
1.00	7	10	10	10	5.9	8.1	24

13. Study Authors Conclusions:

	24 Hrs	48 Hrs	96 Hrs
LC50 (ppb)=	0.81	0.46	0.21

NOEL = 0.1 ppb

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14. Reviewers Discussion and Interpretation of the Study:

A. Test Procedures: The test procedure was adequate.

B. Statistical Analysis: The statistical analysis results match the data.

C. Discussion/Results: This test shows that MK-936 is very highly toxic to shrimp.

D. Adequacy of the Study: This study fulfills the guideline requirements for an estuarine aquatic invertebrate LC_{50}

15. Completion of One Liner for Study: One-liner completed

16. CBI Appendix: N/A